

Applicants, in contrast, have specifically recited in independent Claim 21 a trench "having a characteristic profile produced by an etch process" and filling that trench while still "*retaining* the characteristic profile of the trench." The skilled artisan will readily appreciate such a product as lacking the bird's beak produced by a LOCOS process.

The Examiner has *expressly ignored* these claim recitations, stating that they "are method recitations in a device claimed, and they are non-limiting, because only the final product is relevant, not the method of making." Final Office action at pp. 2-3. The Examiner cites to MPEP Section 2113 for the proposition that Applicants recite a product-by-process claim, and that the manner in which the product is made is not relevant.

Applicants submit that this legal proposition is irrelevant in the present context. The rule about product-by-process claims refers only to the situation where the product-by-process is structurally identical to a product made by a prior art process.

"*Once a product appearing to be substantially identical* is found and a 35 U.S.C. 102/103 rejection made, the burden shifts to the applicant to show an unobvious difference." M.P.E.P. §2113 (emphasis added). In the present application, the cited prior art does *not* appear substantially identical to the claimed structure. Figure 5 of Anjum et al. illustrates the product of their LOCOS process, showing a different structure than a "trench having a characteristic profile produced by an etch process."

As one of skilled in the art will recognize, local oxidation of silicon (LOCOS) produces a characteristic shape including a bird's beak that is readily distinguishable, *structurally*, from the shape produced by etching a trench in silicon and filling the trench with silicon. The skilled artisan would thus understand the product of a trench fill process *is structurally different from* the product of a LOCOS process. The skilled artisan will readily appreciate that Applicants claims exclude LOCOS-produced structures. In other words, Applicants claims recite a *final product that is different* from the final product of Anjum et al.

The Examiner assumes that, simply because process language is used in the claim, that the claim recites a product-by-process limitation. The CCPA has overturned Board findings based upon the same assumption.

The trouble with the solicitor's approach is that it necessarily assumes that claim 1 should be construed as a product claim containing a process, rather than structural, limitation. However, it seems to us that the recitation of the particles as

“interbonded one to another by interfusion between the surfaces of the perlite particles” is as capable of being construed as a structural limitation as “intermixed,” “ground in place,” “press fitted,” “etched,” and “welded,” all of which at one time or another have been separately held capable of construction as structural, rather than process, limitations. The proper inquiry therefore, it appears to us, is whether the product defined by claim 1 is patentably distinguishable over the disclosures of Thomas and Pierce in view of the *structural* limitation defining the panel as “consisting essentially of expanded perlite particles...interbonded one to another by interfusion between the surfaces of the perlite particles.”

*In re Garnero*, 162 U.S.P.Q. 221, 223 (CCPA 1969) (emphasis in original).

Accordingly, Applicants submit that the pending claims recite structures that distinguish the prior art, and therefore respectfully request withdrawal of the rejections for anticipation and allowance of the claims at issue. Obviousness over the asserted art is also addressed below.

#### **Rejections Under 35 U.S.C. Section 103**

The Examiner has also continued to reject Claims 11-16 and 23 under 35 U.S.C. Section 103(a) as being unpatentable over Bose et al. (U.S. Patent No. 5,492,858) in view of Anjum et al. Bose et al. disclosed a trench-filled structure, whereas Anjum et al. taught a LOCOS process formed by masking and thermally oxidizing the surface of the semiconductor substrate.

Applicants' Claim 11 clearly recites “a vertical sidewall” for the recess in the semiconductor substrate, which recess is filled with halide-doped silicon oxide.

The Examiner's combination relies on his finding that “Anjum et al. teaches to form the halide-doped silicon oxide.” “Since the halide-doped silicon oxide can be form [sic] by different processes (thermally grown, CVD, PVD, etc.), therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the trench of Bose et al.'s having the silicon oxide comprising halide-doped [sic] in order to dislodge oxygen at silicon-oxygen bond sites and to enhance thickening effect of oxide regions.” Final Office Action at p. 5.

The reasons given above for the use of halide-doped silicon oxide are taken from Anjum et al. The skilled artisan would not appreciate, from the cited art, that those reasons would have application to making a trench-fill structure. The dislodging of oxygen at silicon-oxygen bond sites and the enhancing of the thickening effect was taught by Anjun et al. as useful for reducing

viscosity during thermal oxidation. Thus, the fluorine addition was taught as useful only for a thermally-grown oxide, which, as noted, is structurally distinguished from the vertical profile that Applicants have claimed.

The Examiner also states "Note that a trench can be formed first, then the halide-doped silicon oxide can be form [sic] later by different processes (thermally grown, CVD, PVD) to form the LOCOS." Final Office Action at p. 5. Presumably the Examiner refers to a known combination of trench-fill with LOCOS, sometimes referred to as "recessed LOCOS." In this case, the asserted combination would involve etching a trench and then conducting a LOCOS process including fluorine doping (as taught by Anjum et al.).

There are many problems with this rejection. Firstly, the Examiner does not provide a reference teaching recessed LOCOS. Secondly, the Examiner has not provided any suggestion from the prior art to use the process of Anjum et al. in a recessed LOCOS process; recessing the surface prior to oxidation already accomplishes reduction of stress, and so it is not clear that the skilled artisan would want to employ fluorine in such a process. Thirdly, and perhaps most importantly, conducting LOCOS on a recessed surface would not meet Applicants' structural limitations. Such a structure would deviate from the recited "vertical sidewall" (Claim 11) and would not have an interface "retaining the characteristic profile of the trench." The skilled artisan would readily appreciate that the LOCOS process (anything more than slight oxidation of the sidewalls) would alter the sidewall structure left by a trench etch.

Because the Examiner is employing motivations that are useful only for thermally grown oxides, and applying those reasons for combining halide-doping with a trench fill process, it is evident that the Examiner is relying upon hindsight in view of the present application. Furthermore, the asserted combination (essentially asserting a recessed LOCOS process employing the LOCOS teachings of Anjum et al.) would not meet the structural limitations Applicants have recited.

Accordingly, Applicants request reconsideration of the rejections for obviousness, and respectfully submit that the claims are allowable over the art of record.

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CONCLUSIONS

In view of the foregoing remarks, Applicants respectfully request reconsideration of the application, and submit that the application is in condition for allowance. If, however, the Examiner feels that some issue remains that can be resolved by Examiner's amendment, the Examiner is cordially invited to call the undersigned for authorization.

Respectfully submitted,

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